Traffic Analysis Report

INTRODUCTION:

This report summarizes the findings of existing road conditions and the anticipated impact of the proposed closure of Pickett Road associated with the Hollow Rock Access Area Master Plan (http://www.co.orange.nc.us/ercd/parks/HollowRockAccessArea.asp).

The scope of this study is to assess if proper traffic control measures are currently in place on the surrounding roadway network and to determine the impact of the traffic redistribution by the proposed closing of Pickett Road at Erwin Road. It was determined that the following traffic conditions would need to be studied in order to accomplish this objective.

- Existing (2010) traffic conditions
- After (with closure of Pickett Road) traffic conditions

STUDY AREA:

The site (New Hope Preserve) is located on the southeast side of Erwin Road (SR 1306) just south of the intersections of Kerley Road (SR 1304) and Randolph Road (SR 1302). This report focuses on the following intersections:

1) Pickett Road (SR 1303) and Randolph Road (SR 1302)
2) Erwin Road (SR 1306) and Randolph Road (SR 1302)
3) Erwin Road (SR 1306) and Kerley Road (SR 1304)

ANALYSIS PROCEDURE:

Study intersections were analyzed using the Traffic Control Signal Warrants as outlined in the 2003 Manual on Uniform Traffic Control Devices (MUTCD) published by the U.S. Department of Transportation. As outlined in this manual a comprehensive investigation of the physical characteristics of the above referenced intersections, as well as the surrounding road grid network was completed. In addition, we collected the daily traffic volume for one week, collected speed data, and examined the individual accident history reports for the respective intersections.

For evaluation of existing conditions, the highest daily volume for each approach was selected for analysis purposes. For the proposed closing of Pickett Road, traffic counts that were previously collected (2009) at the proposed closure point were factored into the existing conditions.

Existing and proposed conditions were evaluated utilizing the 2006 PC-Warrants for Windows software, published by JAMAR Technologies, Incorporated.

ANALYSIS:

Pickett Road and Randolph Road

The intersection was analyzed for signalization under existing and proposed conditions (closure of Pickett Road) with the following roadway characteristics. Copies of the signal warrant analysis and accident history report are attached.

Existing Conditions:

- Four-way intersection with a single lane approach for all directions
- Unsignalized with stop sign control on Randolph Road
- Stop ahead sign approaching intersection on Randolph Road (NB)
- Intersection ahead warning sign on Pickett Road approaching Randolph (WB)
- Adjacent land use is residential
- School Zone west of intersection
- Axle Weight Limit of 6.5 tons east of Randolph Road on Pickett Road
- No overhead lighting at the intersection proper
- No sight distance obstructions observed
- Posted speed limit:
    - South of Pickett Road on Randolph Road 25 mph
    - North of Pickett Road on Randolph Road 35 mph
    - Pickett Road 35 mph east and west of Randolph Road

Findings: (Existing Conditions)

No signal warrants were met and no deficiencies were identified from a pavement marking or signing standpoint. The accident history report, for the last five years, revealed three correctable type accidents. There were no correctable accidents reported over the last year. In summary, the intersection does not meet the threshold for crash experience as outlined in the signal warrants.

Findings: (Proposed Conditions)

No signal warrants were met with the proposed closure of Pickett Road.

Erwin Road and Randolph Road

The intersection was analyzed for signalization under existing and proposed conditions (closure of Pickett Road) with the following roadway characteristics. Copies of the signal warrant analysis and accident history report are attached.

Existing Conditions:

- Tee intersection with single lane approach eastbound on Erwin Road
- Two lane approach (1 TH, 1 LT) westbound Erwin Road
- Two lane approach (1 LT, 1 RT) northbound Randolph Road
- Unsignalized with stop sign control on Randolph Road
- Stop ahead sign approaching intersection on Randolph Road (NB)
- Intersection ahead warning sign on Erwin Road (EB) & (WB)
- Adjacent land use is primarily vacant with some residential
- School Zone east of intersection
- No overhead lighting at the intersection proper
- No sight distance obstructions observed
- Posted speed limit:
    - Randolph Road 35 mph
    - Erwin Road 45 mph

Findings: (Existing Conditions)

Signal warrants #1, #2, #3, and #8 were met. No deficiencies were identified from a pavement marking or signing standpoint. The accident history reports, for the last five years, revealed one rear-end type accident. No accident patterns or concerns from a safety standpoint were identified.

Findings: (Proposed Conditions)

Signal warrants #1, #2, #3, and #8 were met. No additional warrants were met with the proposed closure of Pickett Road factored in; however, an additional condition was met under warrant #1. In addition, the number of hours exceeding the thresholds increased under multiple conditions within the individual warrant summaries. The proposed closure of Pickett Road further signifies the need for additional traffic control at this intersection.

Erwin Road and Kerley Road

The intersection was analyzed for signalization under existing and proposed conditions (closure of Pickett Road) with the following roadway characteristics. Copies of the signal warrant analysis and accident history report are attached.

Existing Conditions:

- Tee intersection with single lane approach for all directions
- Unsignalized with stop sign control on Kerley Road
- Stop ahead sign approaching intersection on Kerley Road (SB)
- Intersection ahead warning sign on Erwin Road (WB)
- Adjacent land use is residential and commercial
- School Zone north of intersection
- Overhead street lighting on one corner of the intersection
- No sight distance obstructions observed
- Posted speed limit:
    - Kerley Road 45 mph
    - Erwin Road 45 mph

Findings: (Existing Conditions)

Signal warrants #1, #2, #3, and #8 were met. No deficiencies were identified from a pavement marking or signing standpoint. The accident history reports revealed that there were a total of 6 accidents over the last 5-year period resulting in 2 injuries with total property damage of $37,600. Of the 6 reported accidents, 2 were of the correctable nature. The severity index was 11.83. There were no correctable accidents reported over the last year. In summary, the intersection does not meet the threshold for crash experience as outlined in the signal warrants.

Findings: (Proposed Conditions)

Signal warrants #1, #2, #3, and #8 were met. No additional warrants were met with the proposed closure of Pickett Road factored in; however, an additional condition was met under warrant #1. In addition, the number of hours exceeding the thresholds increased under multiple conditions within the individual warrant summaries. The proposed closure of Pickett Road further signifies the need for additional traffic control at this intersection.

CONCLUSIONS:

This study revealed the need for additional traffic control at two of the focus intersections. The proposed closure of Pickett Road further solidifies this need.

As noted in this report, currently Warrants #1, #2, #3, and #8 are solidly met at the intersections of Randolph Road/Erwin Road and Kerley Road/Erwin Road. The accident history report did not reveal any existing patterns of concern at either intersection; however, past experience suggests that the crash experience will likely increase when undue delay occurs.

Warrant #3 is the best indicator for undue delay on the minor-street and there are now 5 periods (hours) that are plotting above the minimum threshold for both intersections. This coupled with a posted speed limit of 45 mph on Erwin Road, suggests that there is an increased risk for more severe crashes. We believe appropriate applied traffic control measures can mitigate the potential for such an occurrence. In summary, with 4 significant warrants being met and a potential for severe crashes going forward, we believe there is sufficient justification for immediate action.

The City of Durham recommends signalization at one of the intersections and a roundabout at the other. Signalization is warranted at both intersections, but due to other factors and the unique characteristics of each intersection, signalizing both is not desirable. The main issue, for not signalizing both locations, is the close proximity of the intersections. These two intersections are within 750' of one another. Other determining factors are related to the physical layout of the respective intersections.

The leading factor for selecting Randolph Road and Erwin Road for signalization is for efficiency and operational reasons. Operational reliability will likely translate into a desirable safety performance. Operationally, a signal here will enhance the movement of vehicles due to the spacing with the adjacent existing signal at Lochnora Parkway/Mt. Sinai Road/Erwin Road. The approximate spacing is 1500' and is a desirable distance to maintain vehicular progression for motorists traveling this segment of roadway. Other important factors were carefully evaluated. This intersection is more conducive to adding signalization because of the physical layout. The geometric alignment is advantageous consisting of the classic 90 degree aligned tee intersection with excellent sight lines. Proper channelization, including paved turn lanes are in place and there are no utility conflicts with poles, cabinet, wires, and signal head installations.

The intersection of Kerley Road and Erwin Road is better suited for a roundabout installation. As noted in the MUTCD, signal installation is not the panacea for all traffic problems at intersections. There are other alternatives and in some cases better treatments for addressing the problems associated with signal warrant indicators. One treatment gaining popularity in the United States is the roundabout installation. Unfortunately, the rapid expansion of the use of roundabouts is currently not controlled by any real warrants. However, it has been proven that roundabouts are effective in moving vehicles with decreased delay and greater efficiency than traffic signals in some instances.

Although this intersection does not meet the crash experience warrant for a signal, the severity index is somewhat elevated. Our recommendation for a roundabout is an excellent treatment to

address the high severity indicator. Roundabouts are not only popular for their operational benefits, but are proven to be useful enhancements for traffic calming and safety. A roundabout effectively decreases driving speeds to 30 mph or less and significantly reduces the number of vehicular conflict points. Both characteristics will likely improve the high severity index at this intersection. Another factor supporting a roundabout installation is the close proximity to the intersection of Randolph Road and Erwin Road. While 750' is less than attractive for two adjacent signal installations, this spacing is workable for a roundabout. Lastly, the skewed alignment of Kerley Road with Erwin Road points to a roundabout as a fitting treatment.

RECOMMENDATIONS:

The following are roadway improvements recommended under current conditions:

Pickett Road and Randolph Road

- No improvements are recommended at this intersection

Erwin Road and Randolph Road

- Signal installation is recommended

Erwin Road and Kerley Road

- Roundabout installation is recommended